CLAIMS

1. A membrane or matrix for controlling the permeation rate
of a drug, said membrane or matrix comprising a siloxane-
based elastomer composition comprising at least one
elastomer and possibly a non-crosslinked polymer, charac-
5   terized in that the elastomer composition comprises
poly(alkylene oxide) groups, and that the poly(alkylene
oxide) groups are present in the elastomer or polymer as
alkoxy-terminated grafts of polysiloxane units, or as
blocks, the said grafts or blocks being linked to the
10 polysiloxane units by silicon-carbon bonds, or as a mixture
of these forms.

2. The membrane or matrix according to Claim 1, charac-
terized in that the elastomer composition is an elastomer
made up of polysiloxane units which comprise poly(alkylene
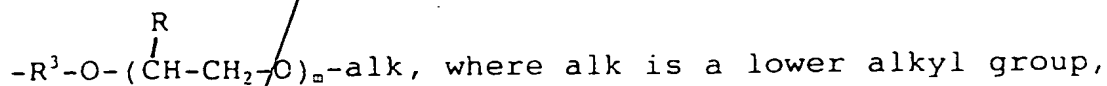15 oxide) groups.

3. The membrane or matrix according to Claim 1 or 2, char-
acterized in that the poly(alkylene oxide) groups are poly-
(ethylene oxide) groups (PEO groups).

4. The membrane or matrix according to Claim 2 or 3, char-
20 acterized in that the formula of the polysiloxane groups is

$-(SiR'R''O)_qSiR'R''-$

where R' and R'' are
- partly free groups, which are the same or different and
which are a lower alkyl group, or a phenyl group, in which
25 case the said alkyl or phenyl group may be substituted or
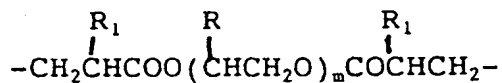unsubstituted, or alkoxy-terminated poly(alkylene oxide)
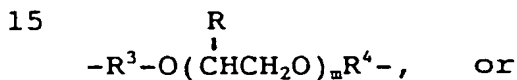groups having the formula

$$-R^3-O-(\overset{\displaystyle R}{\underset{\displaystyle |}{CH}}-CH_2-O)_m-alk,$$ where alk is a lower alkyl group,

suitably methyl, R is hydrogen or a lower alkyl, R^3 is a
straight-chain or branched $C_2 - C_6$ alkyl, and m is 1...30,
- partly bonds formed from the hydrogen or alkylene groups
to other polymer chains in the elastomer, and
5 - possibly partly unreacted groups, such as hydrogen, vinyl
or vinyl-terminated alkene, and
- q is 1...3000.

5. The membrane or matrix according to Claim 4, charac-
terized in that the free R' and R'' groups are a lower
10 alkyl group, preferably methyl.

6. The membrane or matrix according to Claim 2 or 3, char-
acterized in that the poly(alkylene oxide) groups are
present in the elastomer in the form of poly(alkylene
oxide) blocks having the formula

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$$-R^3-O(\overset{R}{\underset{|}{C}}HCH_2O)_mR^4-, \quad \text{or}$$

$$-CH_2\overset{R_1}{\underset{|}{C}}HCOO(\overset{R}{\underset{|}{C}}HCH_2O)_m CO\overset{R_1}{\underset{|}{C}}HCH_2-$$

where R is hydrogen, a lower alkyl or phenyl, R_1 is hydrogen
20 or a lower alkyl, R^3 and R^4 are the same or different and
are straight-chain or branched $C_2 - C_6$ alkyl groups, and m
is 1...30.

7. The membrane or matrix according to Claim 1, charac-
terized in that the elastomer composition is made up of two
25 elastomers interlaced one inside the other, in which case
- the first elastomer comprises poly(alkylene oxide)
groups, and that the poly(alkylene oxide) groups are
present in the said elastomer as alkoxy-terminated grafts
of polysiloxane units, or as blocks, in which case the said
30 grafts or blocks are linked to the polysiloxane units by
silicon-carbon bonds, or as a mixture of these forms, and

that

- the second elastomer is a siloxane-based elastomer.

8. The membrane or matrix according to Claim 7, **charac-terized** in that the second elastomer is a poly(dimethyl

5 siloxane)-based elastomer which possibly comprises
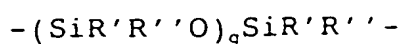poly(alkylene oxide) groups.

9. The membrane or matrix according to Claim 8, **charac-terized** in that the possible poly(alkylene oxide) groups of
the second poly(dimethyl siloxane)-based elastomer are

10 present in the form of alkoxy-terminated grafts of
poly(dimethyl siloxane) units, or as blocks, the said
grafts or blocks being linked to the poly(dimethyl
siloxane) units by silicon-carbon bonds, or as a mixture of
these forms.

15 10. The membrane or matrix according to Claim 1, **charac-terized** in that the elastomer composition is a blend which
comprises
- a siloxane-based elastomer and
- a straight-chain polysiloxane copolymer which comprises

20 poly(alkylene oxide) groups, in which case the
poly(alkylene oxide) groups are present in the said polymer
as alkoxy-terminated grafts of polysiloxane units, or as
blocks, the said grafts or blocks being linked to the
polysiloxane units by silicon-carbon bonds, or a mixture of

25 these forms.

11. The membrane or matrix according to Claim 10, **charac-terized** in that the poly(alkylene oxide) groups are poly-(ethylene oxide) groups (PEO groups).

12. The membrane or matrix according to Claim 10 or 11,

30 characterized in that the formula of the polysiloxane
groups is

$-(SiR'R''O)_qSiR'R''-$

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where R' and R'' are the same or different and are a lower
alkyl group, or a phenyl group, in which case the said
alkyl or phenyl group may be substituted or unsubstituted,
or alkoxy-terminated poly(alkylene oxide) groups having the

5   formula

$$-R^3-O-(\overset{R}{\underset{|}{CH}}-CH_2-O)_m-alk,$$ where alk is a lower alkyl group,
suitably methyl, R is hydrogen or a lower alkyl, R^3 is a
straight or branched $C_2 - C_6$ alkyl group, m is 1...30, and q

10   is 1...3000.

13. The membrane or matrix according to Claim 12, charac-
terized in that the free R' and R'' groups are lower alkyl
groups, preferably methyl.

14. The membrane or matrix according to Claim 10 or 11,

15   characterized in that the poly(alkylene oxide) groups are
present in the straight-chain polysiloxane polymer in the
form of poly(alkylene oxide) blocks having the formula

$$-R^3O(\overset{R}{\underset{|}{CH}}CH_2O)_mR^4-, \quad \text{or}$$

20       $$-CH_2\overset{R_1}{\underset{|}{CH}}COO(\overset{R}{\underset{|}{CH}}CH_2O)_m CO\overset{R_1}{\underset{|}{CH}}CH_2-$$

where R is hydrogen, a lower alkyl or phenyl, R_1 is hydrogen
or a lower alkyl, R^3 and R^4 are the same or different and
are straight-chain or branched $C_2 - C_6$ alkyl groups, and m

25   is 1...30.

15. The membrane or matrix according to Claim 10, charac-
terized in that the siloxane-based elastomer is made up of
poly(dimethyl siloxane).

16. The membrane or matrix according to ~~any of~~ Claims 10

30   15, characterized in that the siloxane-based elastomer

comprises poly(alkylene oxide) groups, and that the
poly(alkylene oxide) groups are present in the elastomer or
polymer as alkoxy-terminated grafts of polysiloxane units,
or as blocks, the said grafts or blocks being linked to the
5   polysiloxane units by silicon-carbon bonds, or as a mixture
of these forms.

17. The membrane or matrix according to ~~any of~~ Claims 1 /
16, characterized in that it contains a filler, suitably
silica.

10   18. A method for the preparation of a siloxane-based
elastomer which comprises poly(alkylene oxide) groups and
is intended for use in a membrane or matrix controlling the
permeation rate of drugs, characterized in that

a) a vinyl-functional polymer component and a hydride-
15   functional component are crosslinked in the presence of a
catalyst, or
b) a polymer component is crosslinked in the presence of a
peroxide catalyst.

19. The method according to Claim 18, characterized in that
20   the amounts of the vinyl-functional component and the
hydride-functional component are selected so that the ratio
of the molar amount of hydrides to the molar amount of
double bonds is at minimum 1.

20. The method according to Claim 18 ~~or 19~~, characterized
25   in that
I) the vinyl-functional polymer component is

a) a vinyl-functional polysiloxane having the formula
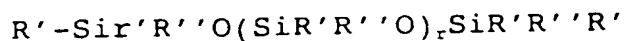
R'-Sir'R''O(SiR'R''O)$_r$SiR'R''R'

where R' and R'' are the same or different and are a
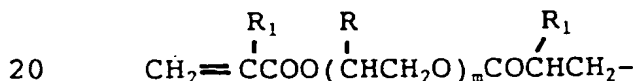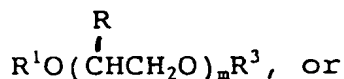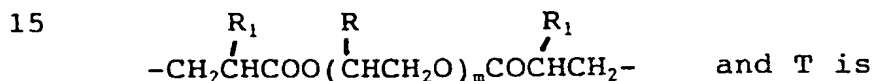30   lower alkyl group or a phenyl group, in which case the

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said alkyl or phenyl group may be substituted or unsub-
stituted, and where some of the substituents R′ and/or
R′′ have been substituted for by vinyl groups, and r is
1...27000, or

b) an alkenyl terminated polysiloxane-based block
copolymer having the formula

$T(AB)_xAT$ (I), where

A = $-(SiR′R′′O)_qSiR′R′′-$, where R′ and R′′ are the same
or different and are a lower alkyl group or a phenyl
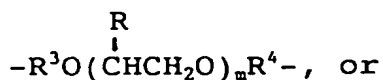group, in which case the said alkyl or phenyl group may
be substituted or unsubstituted;

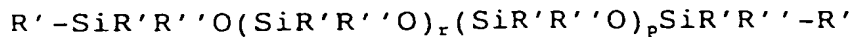B is a poly(alkylene oxide) having the formula

$$-R^3O(\overset{\overset{\displaystyle R}{\displaystyle |}}{C}HCH_2O)_mR^4-, \text{ or}$$

$$-CH_2\overset{\overset{\displaystyle R_1}{\displaystyle |}}{C}HCOO(\overset{\overset{\displaystyle R}{\displaystyle |}}{C}HCH_2O)_mCO\overset{\overset{\displaystyle R_1}{\displaystyle |}}{C}HCH_2- \quad \text{and T is}$$

$$R^1O(\overset{\overset{\displaystyle R}{\displaystyle |}}{C}HCH_2O)_mR^3, \text{ or}$$

$$CH_2\!=\!\overset{\overset{\displaystyle R_1}{\displaystyle |}}{C}COO(\overset{\overset{\displaystyle R}{\displaystyle |}}{C}HCH_2O)_mCO\overset{\overset{\displaystyle R_1}{\displaystyle |}}{C}HCH_2-$$

where R is hydrogen, a lower alkyl or phenyl, R_1 is hy-
drogen or a lower alkyl, R^3 and R^4 are the same or dif-
ferent and are straight-chain or branched $C_2 - C_6$
alkylene groups, R^1 is a straight-chain or branched $C_2 -$
C_6 alkenyl group, m is 1...30, q is 1...3000, and x is
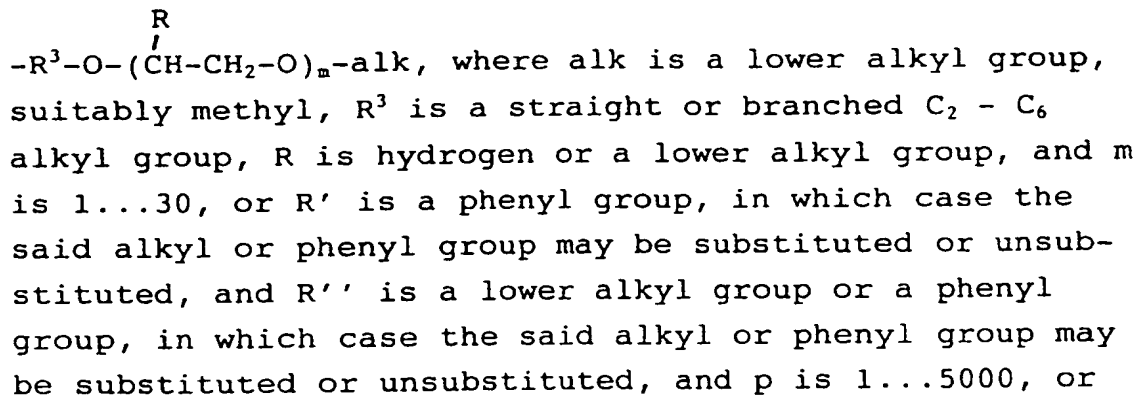0...100, or

c) a vinyl-functional polysiloxane copolymer having the

formula

$$R'-SiR'R''O(SiR'R''O)_r(SiR'R''O)_pSiR'R''-R'$$

- where, in the first block, R' and R'' are the same or different and are a lower alkyl group, or a phenyl
5   group, in which case the said alkyl or phenyl group may be substituted or unsubstituted, and where some of the substituents R' and/or R'' have been substituted for by vinyl groups, and r is 1...27000, and

- where, in the second block, R' is a lower alkyl group,
10   or an alkoxy-terminated poly(alkylene oxide) group having the formula

$$-R^3-O-(\overset{\overset{\displaystyle R}{|}}{CH}-CH_2-O)_m-alk,$$ where alk is a lower alkyl group, suitably methyl, R^3 is a straight or branched C_2 - C_6
15   alkyl group, R is hydrogen or a lower alkyl group, and m is 1...30, or R' is a phenyl group, in which case the said alkyl or phenyl group may be substituted or unsubstituted, and R'' is a lower alkyl group or a phenyl group, in which case the said alkyl or phenyl group may
20   be substituted or unsubstituted, and p is 1...5000, or

d) α,ω-dialkenyl poly(alkylene oxide) having the formula

$$R^1-O-(\overset{\overset{\displaystyle R}{|}}{CH_2}CH_2O)_m-R^2$$
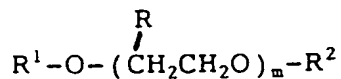
where R is hydrogen or a lower alkyl, R^1 and R^2 are the
25   same or different straight-chain or branched C_2 - C_6 alkenyl groups, and m is 1...30, or

e) a blend of at least two of the above-mentioned components a) - d), and that

II) the hydride-functional component is

a) a hydride-functional siloxane which may be straight-chain, star shaped, branched or cyclic, or
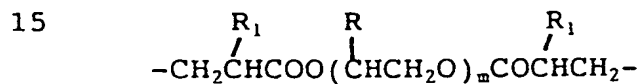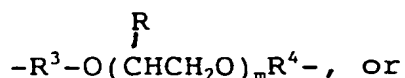
b) a hydride-terminated siloxane-based block copolymer having the formula

$T(BA)_xBT$ (II), where

$T = H\text{-}SiR'R''O(SiR'R''O)_qSiR'R''\text{-}$,
$A = \text{-}SiR'R''O(SiR'R''O)_qSiR'R''\text{-}$, where R' and R'' are the same or different and are a lower alkyl group or a phenyl group, in which case the said alkyl or phenyl group may be substituted or unsubstituted;

B is a poly(alkylene oxide) having the formula

$$-R^3-O(\overset{R}{\overset{|}{C}}HCH_2O)_mR^4-, \text{ or}$$

$$-CH_2\overset{R_1}{\overset{|}{C}}HCOO(\overset{R}{\overset{|}{C}}HCH_2O)_m CO\overset{R_1}{\overset{|}{C}}HCH_2-$$

where R is hydrogen, a lower alkyl or phenyl, R_1 is hydrogen or a lower alkyl, R^3 and R^4 are the same or different and are straight-chain or branched $C_2 - C_6$ alkyl groups, m is 1...30, q is 1...3000, and x is 0...100, or

c) a blend of the above-mentioned components a) and b).

21. The method according to Claim 20, characterized in that the hydride-functional siloxane copolymer is straight-chain, and that its formula is
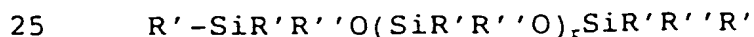
$R'\text{-}SiR'R''O(SiR'R''O)_rSiR'R''R'$

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where R' and R'' are the same or different and are a
lower alkyl group or a phenyl group, in which case the
said alkyl or phenyl group may be substituted or unsub-
stituted, and where some of the substituents R' and/or
R'' have been substituted for by hydrogen, and r is
1...27000.

22. The method according to ~~any of~~ Claims 18 ~~- 21~~, charac-
terized in that the vinyl-functional polymer component
contains a filler, suitably silica.